Contoh kasus sederhana

1. Sebuah pipa dengan diameter 8 inchi dengan *schedule* 140 terbuat dari material A312-TP304L sepanjang 4 meter dikenai beban tekanan internal sebesar 12 MPa, berapakah nilai tegangan sirkumferensial (*hoop stress*) ?

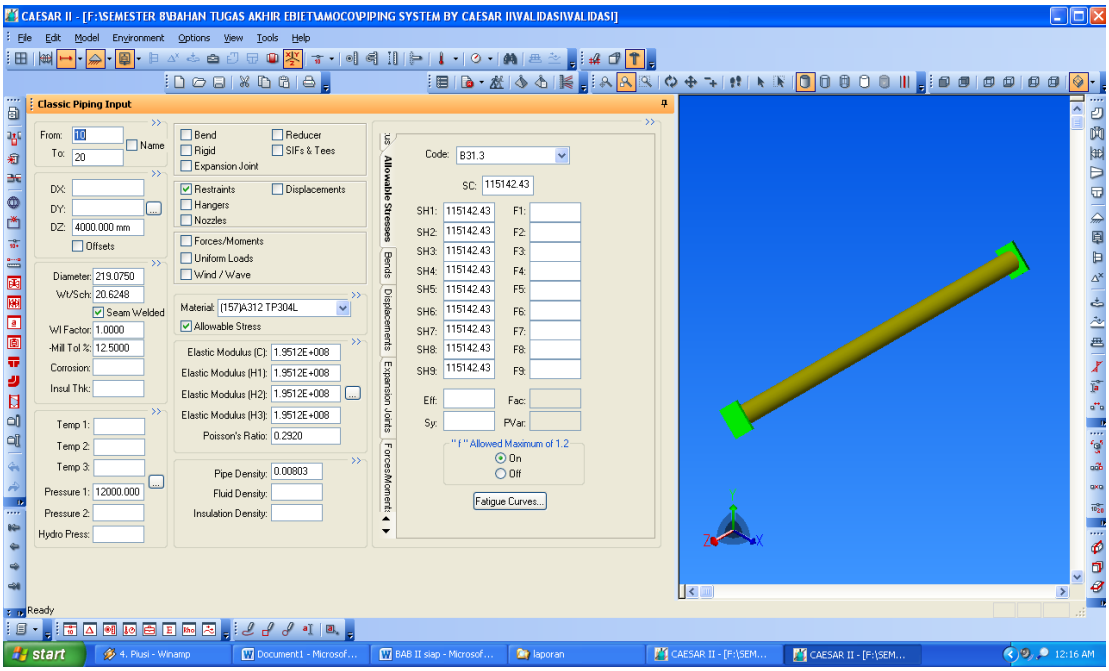
   - Perhitungan manual

$$S_H = \frac{P \ . \ do}{2 \ . \ t}$$

$$S_H = \frac{12 \ \text{MPa} \ . \ 219 \ mm}{2 \ . \ 21\text{mm}}$$

$$S_H = 62{,}57 \ \text{MPa}$$

   - Menggunakan *software* CAESAR



CAESAR II Ver.5.00.6, (Build 061102) Date: SEP 24, 2012 Time: 0:16
Job: F:\SEMESTER 8\BAHAN TUGAS AKHIR EBIET\AMOCO\PIPI...\VALIDASI
Licensed To: -- ID #1234
STRESSES EXTENDED REPORT: Stresses on Elements
CASE 1 (SUS) W+P1

NODE	Axial Stress KPa	Bending Stress KPa	Torsion Stress KPa	Hoop Stress KPa	Max Stress Intensity KPa	SIF In Plane	SIF Out Plane	Code Stress KPa	Allowable Stress KPa	Ratio %

Piping Code: B31.3 -2004, April 29, 2005

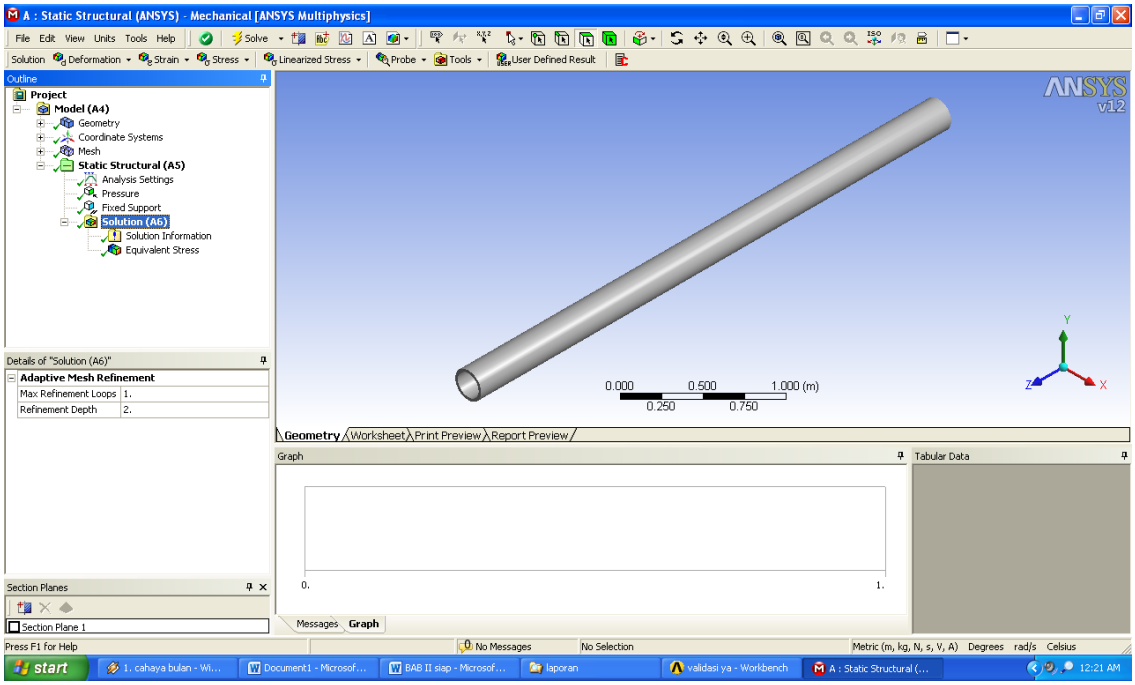
CODE STRESS CHECK PASSED :LOADCASE 1 (SUS) W+P1

Highest Stresses: (KPa)
CodeStress Ratio: 22.1 @Node 10
Code Stress: 25488.0 Allowable: 115142.4
Axial Stress: 23177.5 @Node 20
Bending Stress: 2310.5 @Node 20
Torsion Stress: 0.0 @Node 20
Hoop Stress: 51731.4 @Node 20
3D Max Intensity: 70355.0 @Node 20

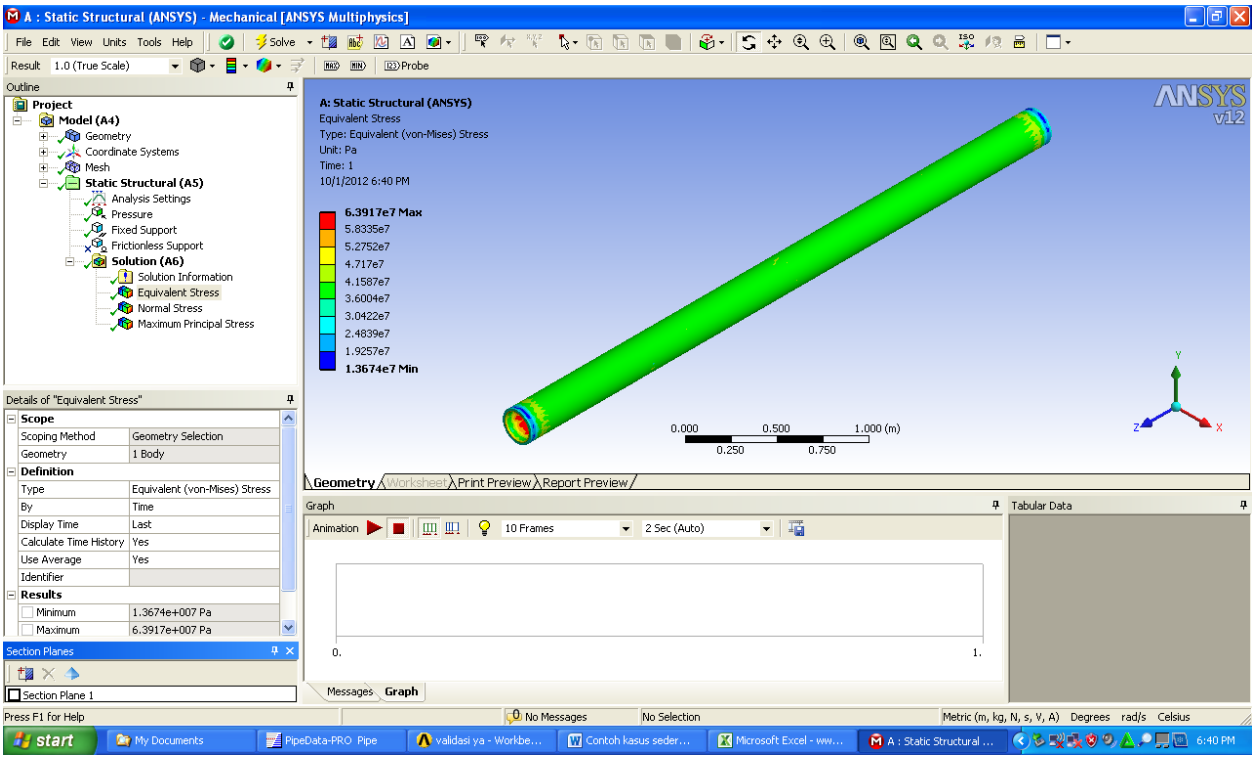
10	23177.5	2310.5	0.0	51731.4	70355.0	1.000	1.000	25488.0	115142.4	22.1
20	23177.5	2310.5	0.0	51731.4	70355.0	1.000	1.000	25488.0	115142.4	22.1

- Menggunakan *software* ANSYS Workbench 12

Import geometri dari solidwork 2007 ke ANSYS Workbench 12



solusi



Nilai tegangan sirkumferensial (σ H)

Perhitungan	**Nilai Tegangan**	***Error* (%)**
Perhitungan manual	62,57 MPa	0
CAESAR	64,37 MPa	2,79
ANSYS Wrkbench 12 (von-misses)	63,92 MPa	2,11